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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/682,502	09/10/2001	Mats Danielsson	GPD0020-US	7905

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EXAMINER	
GAGLIARDI, ALBERT J	
ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 06/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/682,502	Applicant(s) DANIELSSON, MATS
	Examiner Albert J. Gagliardi	Art Unit 2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 May 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 May 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 14 April 2003 has been entered.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. The corrected or substitute drawings were received on 14 April 2003. These drawings are acceptable.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-7 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (US 4,937,453) in view of Fröjd (US 5,744,806), Iwanczyk (US 5,227,635) and Nygren (US 5,434,417).

Regarding claim 1, *Nelson* discloses an apparatus suggesting a method of detecting x-rays for obtaining improved radiographic images comprising the steps of: orienting a semiconductor radiation detector having a height greater than its thickness (see generally Figs. 1, 4 and 6A), the detector comprising a substrate (10) and pixel sensors formed as strips (12); wherein the orientation step includes selecting an acute angle between a direction of the incident radiation such that the incident radiation mainly hits the side of the detector (col. 7, lines 7-11) and wherein substantially all of the radiation is dissipated within the detector (see col. 4, lines 12-16 for example); and arranging a collimator (42) substantially perpendicular to the incident radiation and spaced apart from the detector.

Nelson does not disclose the particular angle of orientation as being less than about ten degrees or that the collimator includes apertures excluding at least one section of the detector between at least one edge of the detector and at least one active sensor area.

Regarding the particular angle as being selected to be less than about 10 degrees, although *Nelson* does not disclose a particular angle, *Nelson* teaches that the particular angle can be chosen to be some angle θ from the horizontal such that the apparent thickness of the detector is increased (col. 7, lines 7-11). Those skilled in the art would appreciate that the apparent thickness would vary from a minimum value when the detector is oriented at a horizontal (i.e., at 90 degrees to the incident radiation) and increase to a maximum apparent thickness as the angle approaches zero degrees, with the particular angle between 0 and 90 degrees being a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the needs of the particular application and the optimal apparent thickness desired.

Regarding the collimator including apertures excluding at least one section of the detector between at least one edge of the detector and at least one active sensor area from the incident radiation, although not specifically disclosed by *Nelson*, it is well known in the art to adjust the aperture size of a collimator such that the radiation beam matches the active area of the sensor (see for example *Fröjd* at col. 4, lines 27-38). *Fröjd* teaches that adjusting the beam size to match the active area of the detector reduces patient dose and improves image quality. *Iwanczyk* (Fig. 1) further teaches that an arrangement of a collimator (21) such that the aperture excludes at least one section of the detector between the edge of the detector and the active area of the sensor area from incident radiation has the further advantage of improving the electric field distribution in the detector, reducing surface leakage current, lowering effective capacitance, and eliminating current injections (abstract). As such, it would have been obvious to a person of ordinary skill in the art to size the aperture such that it excludes at least one section of the detector between the edge of the detector and the active area of the sensor from the incident radiation in order to reduce the radiation dose and improve detector performance.

The examiner further notes that while *Nelson* shows only a single aperture, it is well known and considered as a functionally equivalent design choice depending on the needs of the particular application to utilize multiple sensors and a collimator including multiple apertures (see functionally equivalent alternative arrangements disclosed by *Nygren* at Figs. 4 and 5).

Regarding claim 2, the method suggested by *Nelson* as modified in view of *Fröjd*, *Iwanczyk*, and *Nygren*, suggests using a collimator including a collimator slot to prevent incident radiation from hitting the edge of the detector.

Regarding claim 3, the method suggested by *Nelson* as modified in view of *Fröjd*, *Iwanczyk*, and *Nygren*, suggests an apparatus for detecting x-rays comprising: an x-ray detector able to be oriented relative to the incident radiation (*Nelson* - Figs. 1, 4, 6A) comprising a plurality of semiconductor strips (12; col. 3, line 63-64) arranged on a substrate (10), electrical outputs (12) for each of the strips; and electrical connections (18) between the strips such that the electrical output corresponding to corresponding points in each of the strips is combined, a means (inherent and/or obvious) for orienting the x-ray detector relative to the incident radiation at an acute angle between a direction of the incident radiation and a side of the detector (col. 7, lines 7-11), the detector of sufficient height such that substantially all of the incident radiation dissipates in the detector (see col. 4, lines 12-16 for example), the angle being less than about 10 degrees (obvious design choice); a collimator (42) arranged substantially perpendicular to the incident radiation and spaced apart from the detector, apertures excluding at least one section of the detector between at least one edge of the detector and at least one active sensor area from the incident radiation (obvious modification).

Regarding claim 4, *Iwanczyk* further suggests the use of a guard ring (15) to sink leakage current (col. 1, lines 41-51) and therefore, allow for improved energy detector performance (col. 1, lines 52-54).

Regarding claim 6, *Nelson* as modified in view of *Fröjd*, *Iwanczyk*, and *Nygren*, suggests a collimator having a collimator slot to prevent incident radiation from hitting the edge of the detector.

Regarding claim 7, *Nygren* suggests a functionally equivalent arrangement including a plurality of detectors each having a collimator slot (see generally Fig. 5).

Regarding claim 9, *Nelson* discloses that detector is made of silicon (col. 3, line 58).

Regarding claim 10, *Nelson* discloses that the detector may utilize different materials (col. 6, lines 62-64). Particular materials such as gallium arsenide and CdZnTe are well known for use in radiation detectors and would have been an obvious design choice.

Regarding claim 11, absent some degree of criticality, the particular side of the detector exposed to the radiation is a matter of routine design choice depending on the particular needs of the application.

Regarding claim 12, *Nelson* discloses that the apparatus is used in scanned slot medical imaging (col. 1, lines 5-9). The examiner further notes that "use" limitations are not structural limitations (see not above).

Regarding claim 13, *Nelson* discloses that the apparatus is used in scanned slot medical imaging (col. 1, lines 5-9). Medical imaging applications such as mammography, bone densitometry, and non-destructive testing are well known and would have been an obvious design choice. The examiner further notes that "use" limitations are not structural limitations (see not above).

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Nelson*, *Fröjd*, *Iwanczyk* and *Nygren* as applied above, and further in view of Jahnke (DE 196 18 465).

Regarding claim 8, regarding the use on an absorber placed between detectors, it is well known in the art (see for example *Jahnke*) to include the use of an absorber (3) placed between adjacent detectors (1). Those skilled in the art appreciate that the use of such absorbers allow for better system performance by reducing cross-talk and scattered radiation between detectors. As such it would have been obvious to a person of ordinary skill in the art to modify the device disclosed by *Nelson* and *Iwanczyk* to include absorbers in order to improve system performance.

Response to Arguments

7. Applicant's arguments with respect to claims 1-4 and 6-13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert J. Gagliardi whose telephone number is (703) 305-0417. The examiner can normally be reached on Monday thru Friday from 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Albert J. Gagliardi
Examiner
Art Unit 2878

AJG
May 29, 2003